Greeks, and in fact they resemble the huts of the present inhabitants of the country. This is observable in a fragment carved in imitation of the cross poles, projecting from the eaves of the hut. A roof having its section in the form of a gothic arch is common. Many of the monuments are each nothing more than the frustum of an obelisk, with a few large fillets as cornice. The monument called the "Harpy Tomb," of which there is a model in the Museum, was of this form, and it was decorated with the sculptures, supposed to represent the story of the Harpies flying away with the daughters of King Pandarus. But the most interesting monument is one erected to commemorate the conquest of Xanthus by Harpagus, the general of Cyrus, in B.C. 546, as described in Herodotus, book i.* When discovered it was a mass of ruins, but has lately been restored in a model, placed in the Museum. This trophy consists of a lofty basement, supporting a peristyle. The former was surrounded at the foot, and beneath the cornice, by the bas-reliefs,—representing the siege of a walled town, and a contest of horse and foot combatants,—which are at present in the collection. The edges of these portions shew the contrivance for procuring a perfect joint; the meeting surfaces are perfectly smooth for the breadth of an inch at the front, but within are left rough for the mortar. The perfect cohesion obtained was equally favourable to the stability of the mass, and the beauty of the work; indeed the joints were sometimes so close that a knife could not be inserted, and it has even been asserted, that many of the Greek temples were constructed entirely without mortar. The cornice of the basement, in the monument under consideration, is curious from its two ovolos, which are placed one immediately above the other; they are enriched, and have beneath them an enriched bead, the whole being decidedly of Grecian workmanship. The top bed of this cornice shews the position of the column of the peristyle which was fastened into the block, probably by a copper plug. It is, however, certain, that a wooden pin was often employed, and one of these was lately presented to the Institute of Architects by Mr. Hamilton. The peristyle has fourteen fluted columns of the Ionic order, supporting a pedimental roof, and inclosing a small "cella," which, however, appears from the *model* to have been built solid. The porticos are tetrastyle, and the intercolumniation areostyle. The bases are peculiar from their extreme height. They have the reeded torus, as in the Erectheum, and beneath it two hollows separated by beads; but the hollows are not like the scotia of the attic base, and, as in Grecian examples, there is no plinth. The frieze is ornamented with sculpture, as are the pediments, and also the frieze of the cella. Parts of these friezes represent the guests seated at a banquet, probably the carousal after the victory. The angles and apex of the pediments have figures in motion, and there are also figures of men and animals in the intercolumns of the peristyle. The ante of the *cella* have very beautiful capitals enriched with paterae, and waterleaves; and are, as in most Greek examples, of less breadth in flank than in front. The order has no architrave; the only moulding beneath the frieze being similar to the tænia in the Doric order. The pieces of the entablature were bound together by copper cramps (⟊ this form), run with lead, as may still be observed. The crowning member of the pediment (*sima*) has been continued along the flanks and ornamented with lions' heads, being in this respect like the Roman system; the Greeks were in the habit of stopping it at a short distance from the front. The dentils are unusually large, and the slabs of the roof covering in the model are also extremely large; is there authority for these peculiarities in a building so essentially Greek?

The greatest interest cannot but be felt in the examination of these remains,—their beautiful workmanship, the fine treatment of the sculptured decorations, place them as second only to the finer works from the Parthenon. They were produced in a country, which had greater influence upon other nations than any other, Athens not excepted. Asia Minor was the nurse of Grecian philosophy and art, and it is melancholy to reflect upon its present debasement.

E. H.

* See BUILDER, page 63, *ante*.

ON THE SHAPE OF HOUSE DRAINS.

SIR,—Having some time since recommended, through the medium of THE BUILDER (pages 593 and 606, vol. ii.), that in the construction of *house drains* it would be extremely desirable to employ good, strong, and well-burnt cylindrical pipes, made of clay, and glazed inside, in lieu of the present method of building them, both cylindrically and rectangularly of common bricks, I cannot but regret that you in your judgment of this matter should have thought it desirable to have somewhat suggested in answer to your correspondent, "A Bricklayer," last week, that the construction of house drains might be of a rectangular or square angled shape; and that they might be thus built of certain sizes equal to a circular area of 9 inches diameter, in order to comply with a clause to that effect in the New Buildings Act.*

In this age of improvement it is highly desirable to promote and enlarge the adoption of scientific principles as much as possible, because the more we have recourse and conform to such principles the more certain and correct will all subjects to which they are applied, be in their results; and upon no subjects, and in no case, are the principles of science more applicable, and more required, than to the improvement and correction of the false principles of drainage. It appears to me that a very great error was committed in framing the clause in question, by leaving the forms, sizes, and construction of house drains so undefined; and also in not declaring at once that for the future all drains should be made of a cylindrical shape, or that their bottoms should be made concave or semicircular, and as even and uniform as possible.

The arrangement and construction of house-drains may seem, and no doubt it is to many builders, a very trifling and worthless affair; their formation being considered of very little consequence, and indeed the manner in which they are generally executed proves this statement to be a fact. No parts of a building require more attention, and more nicety in producing perfection in arrangement and construction than should be observed in the building of house drains. It is by the means of proper and efficient drains that animal and vegetable filth engendered in dwelling houses is usually carried off; and the discharge of this becomes the more certain and perfect according to the pains taken in producing accuracy of form, size, arrangement, and construction of the drains. The building of drains is a subject of great and *serious* consequence, in reference to the effect they are calculated to produce on the health of the inhabitants of dwelling-houses, and, therefore, their utility and efficacy are of the utmost importance to the sanatory condition of the population. The valuable evidence which has been elicited by the inquiries of the Health of Towns Commission, with reference to the subject of drainage, and the impetus that has recently been given to the propriety of providing good and perfect drainage in places where none exists at present, and the agitation which has resulted from its publicity, has had, in a great measure, the desirable and salutary effect of arousing the attention of the public mind to the evil effects of bad, and the necessity and great importance of good and efficient drainage of dwelling-houses. So far as the metropolis is concerned, the New Buildings Act has provided, and that very considerably, for the extension of drainage, by obliging persons to build sewers in front of, and to lay drains into them from all houses that shall hereafter be built, if there be any sewer or open watercourse under the jurisdiction of any of the Metropolitan Commissions of Sewers within 100 feet of such intended new buildings. This is certainly one grand and excellent step towards providing for the extension of house-drainage; but this Act does not provide for the formation of sewers in populated districts where none now exist, nor for obliging persons to build sewers for the drainage of premises or new districts. If the points where sewers have already been carried up, and which are hidden and buried, and the water courses and other places, under the jurisdiction of the various commissions of sewers, be narrowly and strictly watched by the district surveyors, all or most of these points may fall within the distance stipulated by the Act, namely, 100 feet from the intended buildings; and were these points known and properly defined they could be made subservient to the extension of drainage. I think it would be a good and desirable plan to ascertain and mark all these various places and points on a good-sized map for the use and reference of these gentlemen; as otherwise buildings may be allowed to be carried up without any, or an improper drainage, from the surveyors not being properly acquainted with these particulars.

The employment of common bricks in the construction of drains, and especially drains of rectangular formation, cannot be too highly reprobated. Drains of rectangular construction are not only calculated not to afford a powerful resistance to the pressure of the ground which is filled in around them, and therefore are liable from this cause to disarrangement and destruction, but such a form is also contrary to hydraulic principles, as the energy, action, and power of the streams in lifting and carrying along substances in suspension with it, is materially retarded and destroyed by such a form and arrangement, as might very easily be proved. The means of carrying off the animal and vegetable matter from dwellings is entirely dependant upon the quantity and power of the water which passes into the drains; and the mechanical action and power of the water may be rendered altogether inefficacious for this purpose by the sluggishness of their falls, their sizes, and their forms. It is really surprising to observe how persons go on from day to day, and from year to year, forming these things, when they are known to be exceedingly bad in principle and inefficient in action, because such formations have become a business of habit; and also, as is too often evinced, from a stubbornness against introducing improvements. The use of pipes in the construction of drains is rendered the more necessary in consequence of the notorious carelessness of bricklayers in building brick drains; for let it be taken as an *axiom* that whenever a bricklayer has to execute a piece of work which is to be immediately covered over and hidden, without being watched, the chances are that he is sure to perform it in an unsound, slovenly, and improper manner. I have often observed drains being laid through houses in the following manner: two parallel lines of two or three courses of bricks were laid flat, or on edge upon one another, and at about seven inches apart, and sometimes without any mortar; no other bottom or channel being formed or provided for the passage of fluids and substances along them, than what was afforded by merely the *bare earth*. And yet no means are available in preventing such reckless and abominable proceedings.

Of all the routine of construction in buildings, the arrangement of the proper sizes and falls which drains should be of, and their construction as well, are least cared for, and less thought of; so long as there be an aperture and channel formed, whether it be multangular, rectangular, or however various its form may be, it is considered sufficient to answer the purpose; indeed, this too is notorious, and can be proved to the satisfaction of any one if he will only take the trouble to examine their interior constructions. The interiors of drains are usually parts of a building which are unseen; indeed, this is actually the case even during the time of their execution; and the best and only manner of properly observing their state and the way in which they have been built, is by examining their insides from the interior of a sewer; and as this mode of examination does not fall to the lot of but very few persons, I take leave to say that, when thus observed, their appearances are truly abominable. From the improper and imperfect manner in which the brickwork is usually performed, and the bad way in which the ground is filled in around them, the drains are invariably squeezed and crushed into all manner of shapes and sizes; and sometimes while building, their interiors are left half full of either brick rubbish, clay, or gravel, which lays upon their bottoms so long as the drains exist, or till they become entirely choked by the deposition and accumulation of matter, and

* The remark to which our correspondent refers was made simply to explain the meaning of a clause in the Buildings Act, and to shew what *might* be used, and had no reference whatever to the best form.